

Skin Disinfection: In the majority of fractures the patients are dirty and require a considerable amount of cleansing before anything surgical can be done. If possible the leg should be shaved dry and it should then be scrubbed with a solution of iodine with benzine 1 to 1000; 5% tincture of iodine should then be applied in the usual way. The benzine has the effect of removing the dirt and grease from the skin and it does not interfere with the subsequent disinfecting effect of the iodine as does soap and water, which should never be used.

Skin Protection: The most important part of the entire technic, in my opinion, is the protection of the field of operation against contamination. First the limbs must be covered with sterilized towels which are fastened by hooking them to the skin by means of small vulsella; there is no danger of infection whatever when these are used on the sterilized skin and they fix the towels so that they never slip.

It is important to scratch the skin with a sharp needle to mark the situation and the length of the contemplated incision. If the towels have been attached to the skin, the landmarks and the position of the fragments have been obliterated, and as handling of the skin is prohibited it is essential to know where the incision is to be made; this is shown where the skin has been scratched in a very satisfactory way.

Napkins must then be attached by vulsella close to the skin scratch, so that only a small area of skin is visible on each side of the scratch, then the incision is made over the scratch without touching the skin with the hand; this incision is carried through to the muscle; gauzes are then attached to the fascia by four-pronged right-angled vulsella in such a way that they do not go through the skin so that this structure is entirely excluded from the field of operation. In this way micro-organisms that may be forced out of the upper layers of the skin during any manipulation are not thrown into the wound but are absorbed by these gauzes.

I believe that it is largely due to this part of the technic that we are able to obtain such perfect results, for it is well known that the majority of our wound contaminations come from the skin.

Incision: The position and size of the incision is determined by the skin scratch.

Length of Incision: It might be stated epigrammatically that the shorter the time after the accident that the operation is performed, the shorter will be the incision.

Approximation and Fixation of Fragments: The following principles should be observed in the proper approximation of the bone fragments.

1. The plates in general use for recent fractures (with the exception of vanadium steel) are much too thick. Proper approximation can only be accomplished by mobilization and extension which permits the fragments to come together. The plates are really intended to act as splints and

should not be expected to maintain approximation by their great thickness and tensile strength.

2. In order to obtain perfect approximation the fragments remain together without any displacement, then the plate is applied. As there is no tendency on the part of the bone to displacement if satisfactorily reduced, the plate is not subjected to any strain. These remarks apply only to recent fractures where mobilization is easy.

3. With the patient on the pelvic elevator and with a perineal upright that causes counter-traction and extension of the leg by means of mechanical traction that gives a steady pull, plating of the bone is easy and hardly any of the instruments advocated to hold the bone in position are necessary. The subsequent dressing and plaster spica is easily applied as the patient is not resting on the table so that there can be no shifting of the bone as is frequently the case if the patient is lying on the table under extension, for the bone is apt to slip with the movements of the patient during the time that the plaster bandage is being applied.

The subject of plates and screws and the apparatus used in the operation for bone fracture will not be taken up.

Drainage: This should never be employed. Experience has shown that it is not necessary and there is always danger of infection in the track of the tube. With the bone in position and a firm well applied plaster bandage the pressure is equalized so that healing is perfect without any accumulation of serum.

Closure: There is no necessity to bring the muscles together by suture as the incision is always made in the direction of the muscle fibres which fall together when the wound is closed.

The periosteum need never be sutured and even if this is attempted, experience has shown that it is frequently impossible to suture this structure satisfactorily.

With the incision made longitudinally, the fascia even if it is not sutured, shows no tendency to cause widening of the scar so that all that is necessary is to close the skin with clips which obviate the necessity of introducing the hand into the wound.

References:

- ¹ Observations Upon the Open Treatment of Fractures, Surgery, Gynecology and Obstetrics, February, 1911, pages 162-65.
- ² Treatment of the Spiral Fractures of the Tibia, California State Journal of Medicine, May, 1913, page 188.

A NEW TREATMENT OF POLIOMYELITIS.*

By D. H. MOULTON, M. D., Chico.

In presenting this paper to you, I wish to offer for your consideration that which seems to me to be of great import at the present time.

We all know from our observation and from our readings what terrible afflictions the recent

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edipemic of poliomyelitis have wrought upon the babies and children and even adults of this and other countries. We see the effect of this dread disease all about us and aside from plaster paris, braces, and operative procedure, we have been almost powerless to help the little ones, and restore them to normal, so that they might take their respective places in the great caravan of life and be normal, useful men and women.

It is estimated that there are over a million children in the United States growing up somewhat deformed as the result of this disease; and now the light seems to be shining through the clouds of uncertainty, which have always hung over these cases.

At the Rockefeller Institution which I visited last year, a great work is being done; trying to get a serum or antitoxin or vaccine to prevent this disease in its advance on our children. At the institution I saw numbers of little sufferers in the fever stage and later these same little ones were sent to the different orthopedic hospitals to be worked upon with plaster and braces; and later sent out into the world as incurable.

There seems some hope now for the little ones, and the object of this paper is to present to you an outline of this rational treatment and urge you to give it a trial and give the babies the benefit of it, for many have been cured and many more will be restored to normal by its use.

Last month I spent in Chicago with Dr. Roy Bernard, the father of this treatment, and many cases he showed me, convinced me that there was truth and merit in the treatment. Case after case I visited, talked with the parents of the children who had had great deformities, and saw them cured and normal. This treatment to be sure is in its infancy, but from the records of cures, I believe that every child afflicted is entitled to the treatment. It is not claimed that every case presented will be cured, but the percentage of cures of cases already treated is so large that I repeat, "Every afflicted child is entitled to the treatment."

It is not my desire to go into the symptoms, etiology, bacteriology, or even the minute pathology of this disease; suffice it is to say that we are still ignorant as to whether the results of this disease are produced by the direct presence of the micro-organism in the nervous tissues or indirectly by means of a toxin. Osler says, "It is clear from the behavior of the ganglion cells, that these are not specifically susceptible to the influence of the virus, but rather suffer from the effects of inflammatory changes in surrounding tissues."

In some of the fatal cases, live cells have been found in the cord at the point of inflammation. Working along these lines, Dr. Bernard figured that if some means could be applied to nourish these cells of the gray matter of the spinal cord and brain stem, there would be a regeneration of the axis cylinder processes and a growth of the atrophied muscles.

Realizing that the severe inflammatory process

in the cord has caused many adhesions, with a resultant lessened blood supply, it seemed plausible to get a method to attempt to break up these adhesions and yet, not do any more damage to the cord. It was found that by the actual stretching of the cord, this could be accomplished; and the remarkable cures which I have witnessed were brought about by this simple, yet scientific method. At first weights and pulleys were used, but two cases showed hemorrhage, which proved that the shock was too much for the cord. After much experimenting it was found that the best results were obtained by suspending the body with the support just above the affected portion of the cord. In cases of lumbar affection, the support is applied over the 9th, 10th and 11th dorsal, which corresponds to the largest part of the lumbar enlargement of the cord.

In case of cervical affection, the support is applied over the 2nd, 3rd, 4th and 5th cervical vertebrae, so that the extension will be at the 6th cervical, which corresponds to the largest part of the cervical enlargement of the cord.

The technic of the treatment is very simple, but must be carried out carefully, and it must be understood that the longer the time elapsed between the onset of the disease and the beginning of treatment, the slower the results. But if there are any remaining cells at all, you may certainly expect good results. The treatments are given every 2nd or 3rd day and it may be necessary to cover a longer period of time; that is, several months. Some of the cases develop after the first few treatments, a return of the initial symptoms: high fever, vomiting and diarrhoea. In these cases it was found the results were very rapid and the child made quick recovery.

In case the legs are involved the treatment is given at the lumbar enlargement, the belt being fastened so that the groove in back of the belt fits over the 9th, 10th and 11th dorsal, the rings in front of the belt should be in the mammary lines. When the child is suspended the belt acts as a fulcrum and we get the extension at the proper place. For the first minute the child is allowed to hang quietly, during which time there is first a natural resistance of the muscles, followed quickly by a complete relaxation; as soon as this relaxation occurs the body is swung forward and backward so as to get the bend at the 12th dorsal, then slightly from side to side, always supporting the child with one hand on the back of the belt. This should be done for two or three minutes.

In treating cases where the arms are involved the extension of the spine should be at the 6th cervical vertebrae. Have the patient lie on back, place your fingers on each side of the spinous process of the 2nd, 3rd, 4th, and 5th cervical vertebrae, making an extension that will almost move the weight of the body from the table for from one-half to one minute; or to get more extension, stand in front of the patient, place the tips of your fingers on the transverse processes of the 2nd, 3rd, 4th, and 5th cervical, gently extend the cervical region until the patient is

lifted from the floor, gently throwing the junction of the cervical and dorsal; this makes the extension of the 6th cervical, which is the largest part of the cervical enlargement of the cord. Swing the patient gently forward and backward, then from side to side for one-half minute.

The object of the treatment is to obtain an increased blood supply to the involved areas, which naturally aids absorption and stimulates vasomotor function. This in turn nourishes the cells, with a resultant regeneration of the nerve and a growth of the atrophied muscles.

In closing I wish to give a few brief histories of a few of the many cases I saw last month.

1. Julia Ur, age 18 years, onset January 6th, 1913. Right leg completely paralyzed with atrophy, including the hip muscles. Treatment began March 5th. The muscles of the leg have been entirely restored and the gluteal muscle has filled out to normal.

2. T. B. Girl age 3, onset Sept. 8th, 1912. Treated at Cook County Hospital for two months without any improvement. Treatment commenced Nov. 15th, 1912. Some motion was noticed three weeks after. Could walk two months later and was pronounced cured in three months.

3. J. B. C. Boy age 3, onset July 28th, 1912. Atrophy of both arms and legs. Legs drawn up in flexion. Treatment commenced May 1st, 1913. After 11th treatment muscles of legs relaxed. Could walk well and use arms by Aug. 1st, 1913.

4. Catherine E, age 11, onset August, 1907. Extended foot. Left leg atrophied and foot taliped. Treatment commenced Jan. 25th, 1913. After third treatment toes relaxed; after twelfth treatment general improvement. After sixteenth treatment could jump rope. Was pronounced cured April 12th with all motions normal.

5. Virginia M. (my own child). Onset Sept. 28th, 1910. Paralysis of all muscles of right leg below the knee and of quadriceps extensor above the knee. Treatment commenced Sept. 18th, 1913. Has now had about 20 treatments and much improvement is noticed.

I now have a clinic at my office in Chico at which I am treating a dozen cases, and some of these cases have shown a marked improvement during the month I have been treating them.

I will be very pleased to instruct any physician who might care to visit my clinic, so that he might treat his own cases at his own office.

SURGICAL COMPLICATIONS, TREATMENT AND PREVENTIONS.*

By C. P. THOMAS, M. D., Los Angeles.

The life of an active practitioner of surgery is not, as is supposed by some, one of constant bliss and sunshine, for in addition to the enormous amount of mental strain he is under while actually operating, because of the gravity of the cases he undertakes, and the risks to which he must submit both himself and patients, he must be constantly on the outlook for the unexpected to follow in the way of complications, many of which, so far, I believe, are unavoidable. Rapid, uninter-

rupted recoveries are so frequent after operations that I fear we sometimes forget the grave and serious conditions that may occur.

I will endeavor in this brief paper to outline some of the more common unfortunate complications which may occur and a few means of prevention.

Admitting that every preliminary precaution has been taken in advance of the operative procedure, in the way of careful examination of the physical conditions, of the urine, feces and blood, etc., nevertheless any of the following unforeseen complications may occur:

1. Death from Anesthesia.
2. Death from Acute Nephritis.
3. Death from Pulmonary Embolism.
4. Regional Death from Arterial Thrombosis.
5. Death from Hyperthyroidism, from an Unrecognized Graves' Disease.
6. Death from Hemorrhage from the Mucous Membrane of the Alimentary Tract.
7. Phlebitis, With or Without Suppuration, With Possible Death.
8. Parotiditis, With or Without Suppuration.
9. Acute Dilatation of the Stomach.
10. Acute Gastritis.
11. Pneumonia, or Acute Hypostatic Congestion of the Lungs.
12. Non-Union of Bones or Soft Tissue.
13. Cystitis and Pyelitis.
14. Post-Operative Hernia.
15. Delirium Tremens.
16. Unrecognized Lesions.

During the past twenty years, the writer has had at least one patient with each of the above-named complications, and some of them have been seen many times following some surgical procedure, which may or may not have been severe, and he will endeavor to describe them briefly, with suggestions for their prevention and treatment.

1. *From Anesthesia.* In 1897, I lost a large, bony miner from chloroform, less than one drachm having been administered, on an open mask, and before the operation had been begun. He had been on a protracted spree, was in poor condition for the anesthetic, and was suffering from tubercular osteitis.

I thereupon abandoned chloroform and have since used gas and ether exclusively. I have had ether administered to patients in large numbers, with severe heart lesions, and to others who had chronic nephritis, without its producing any apparent increase in the heart or kidney trouble. Spinal analgesia has but a limited field of usefulness and Crile's combination analgesia may yet be more generally adopted.

2. *Acute Nephritis.* This has followed surgical procedures, regardless of the anesthetic used, in a small percentage of cases. Some have been severe with complete suppression, and have died; others less severe and have recovered. I am of the opinion that nephritis can best be avoided by keeping the patient and operating room warm and free from

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